

NAME _____

Wkst #5

PERIOD _____ DATE _____

MAXIMUM AND MINIMUM
Examples

1. A ball is thrown straight up with an initial velocity of 64 feet per second. The height of the ball t seconds after it is thrown is given by the formula $h = 64t - 16t^2$. After how many seconds will it reach its maximum height? What will this maximum height be?
2. Dave has 120 feet of fence to make a rectangular kennel for his dogs. If the house is to be used as one side of the kennel, what should the dimensions be to produce the maximum area?
3. Melissa plans to put a fence around her rectangular garden. She has 150 feet of fencing material to make the fence. If there is to be a 10-foot opening left for an entrance on one side of the garden, what dimensions should the garden be for maximum area?
4. An object is fired upwards from the top of a 200-foot tower at a velocity of 80 feet per second. The height of the object t seconds after firing is given by the formula $h = -16t^2 + 80t + 200$. After how many seconds will the object reach its maximum height? What will this maximum height be?

1. A rectangular garden is to be enclosed on three sides by fencing: the fourth side is the side of the house. What is the largest garden that can be enclosed by 30 meters of fencing?
- 2) If you throw a ball upward with a velocity of v meters per second, its distance in meters, s , above the starting point in t seconds is shown by experiment to be $s = vt - 4.9t^2$. If the ball is thrown with an initial velocity of 30 meters per second, this formula becomes $s = 30t - 4.9t^2$. How many seconds will it take the ball to reach its highest point? How high will it go?
- 3) A manufacturer of lighting fixtures has daily production costs of $C = 800 - 10x + .25x^2$, where C is the total cost in dollars and x is the number of units produced. How many fixtures should be produced each day to yield a minimum cost?
- 4) One thousand feet of chain link fence will be used to construct six cages for a zoo exhibit. Find the dimensions that maximize the enclosed area.

- 5) The path of a diver is given by $y = -\frac{4}{9}x^2 + \frac{24}{9}x + 12$ where y is the height in feet and x is the horizontal distance from the end of the diving board in feet. What is the maximum height of the dive?
- 6) Standing on the roof of a building 160 feet above the ground, Sheri threw a ball upward with a speed of 48 ft/sec. The formula $h(t) = -16t^2 + 48t + 160$ gives the height in feet, h , of the ball relative to the ground after t seconds.
 - a) After how many seconds did the ball reach its maximum height?
 - b) What is the maximum height reached by the ball?
 - c) After how many seconds did the ball strike the ground?
- 7) The rate of photosynthesis in a certain plant depends on the intensity of light x according to the formula $R(x) = 270x - 90x^2$.
 - a) At what intensity will the rate be the maximum?
 - b) What is the maximum rate of photosynthesis?